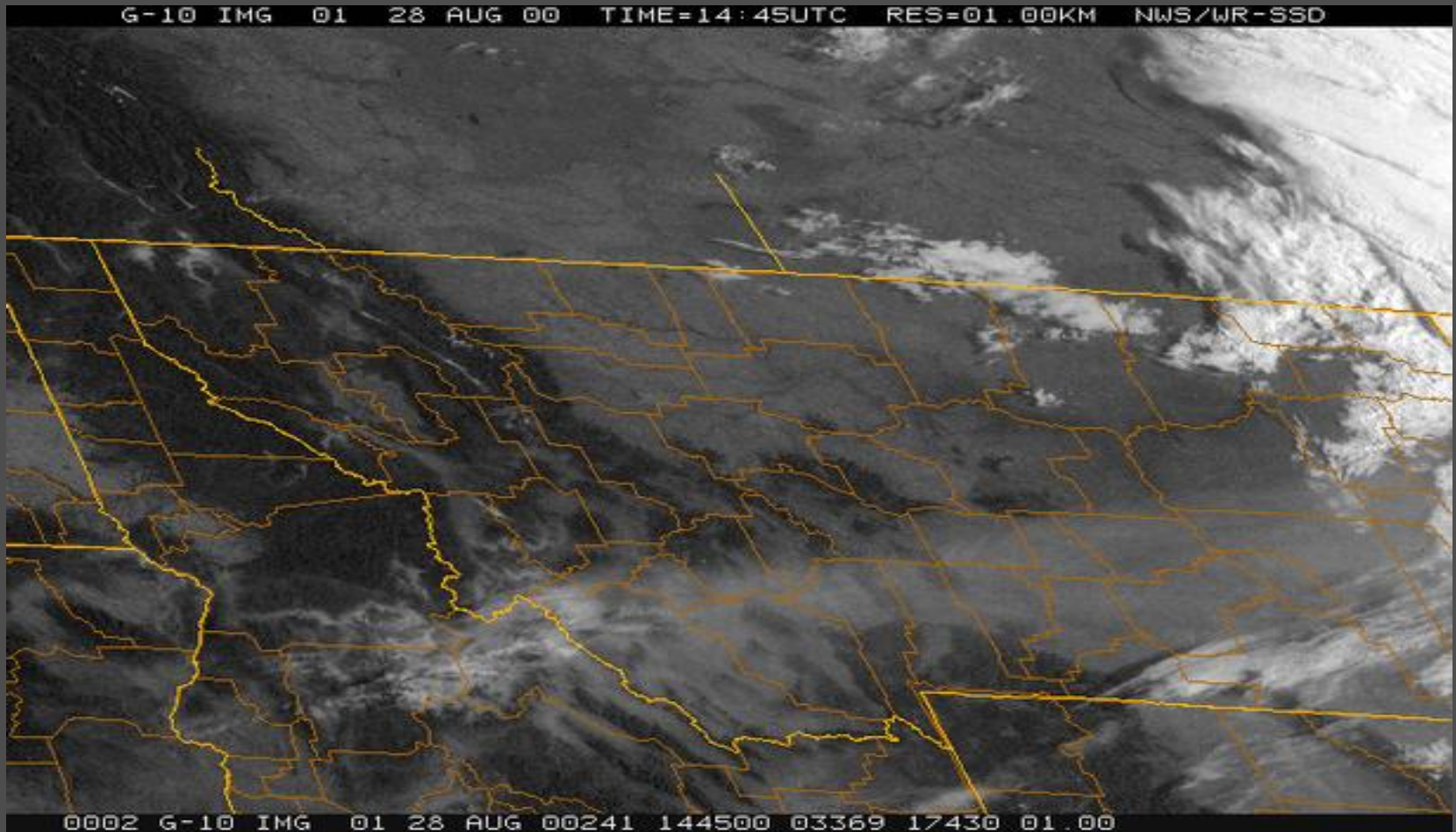


Air Quality in Gallatin County



Bob Jeffrey

Montana Department of Environmental Quality

Discussion Topics

- Ambient Air Quality Standards
- What is Particulate Matter (PM)?
- PM₁₀ & PM_{2.5} Data & Source Review
- PM_{2.5} NAAQS Compliance Review
- Internet Information Sources
- Question and Answer Session

Ambient Air Quality Standards

- Primary Standards protect human health - including 'sensitive' populations with health issues, such as children and senior citizens.



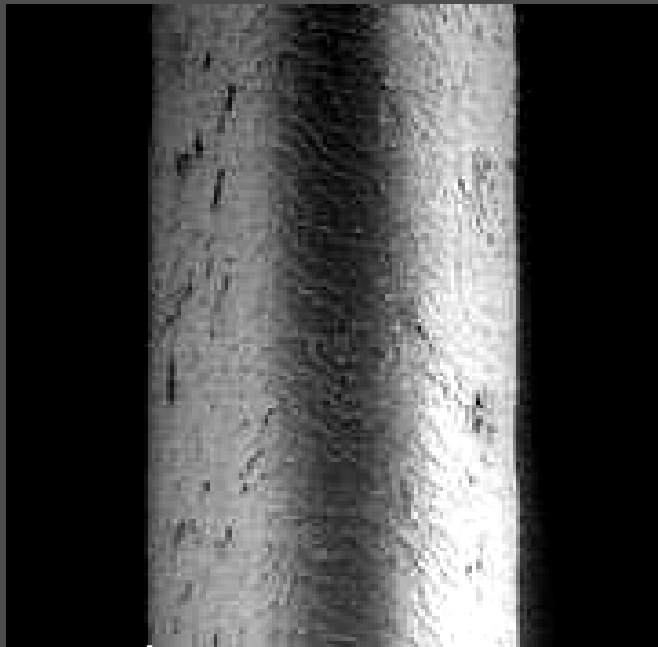
Ambient Air Quality Standards

- Secondary Standards protect public welfare (e.g. crops, buildings, visibility)



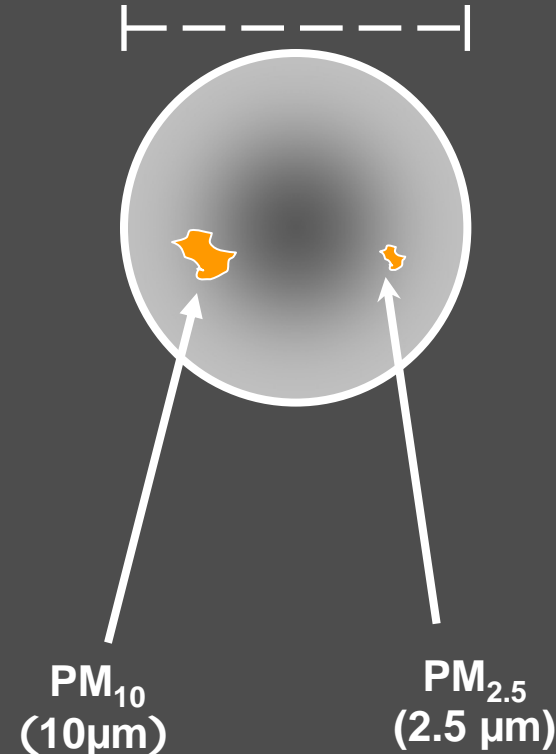
WHAT IS PARTICULATE MATTER (PM)?

- Complex mixture of extremely small solid particles and drops of liquid in the air



Human Hair (70 μm diameter)

Hair cross section (70 μm)






- Mount St. Helens
- 18 May 1980
- 520 million tons of ash
- 1.4 billion yd³ of ash
- Covered 22,000 sq.mi.
- 3 days across USA
- 15 days around Earth
- Wide range PM sizes

Mostly PM₁₀ but some PM_{2.5} (diesel exhaust)



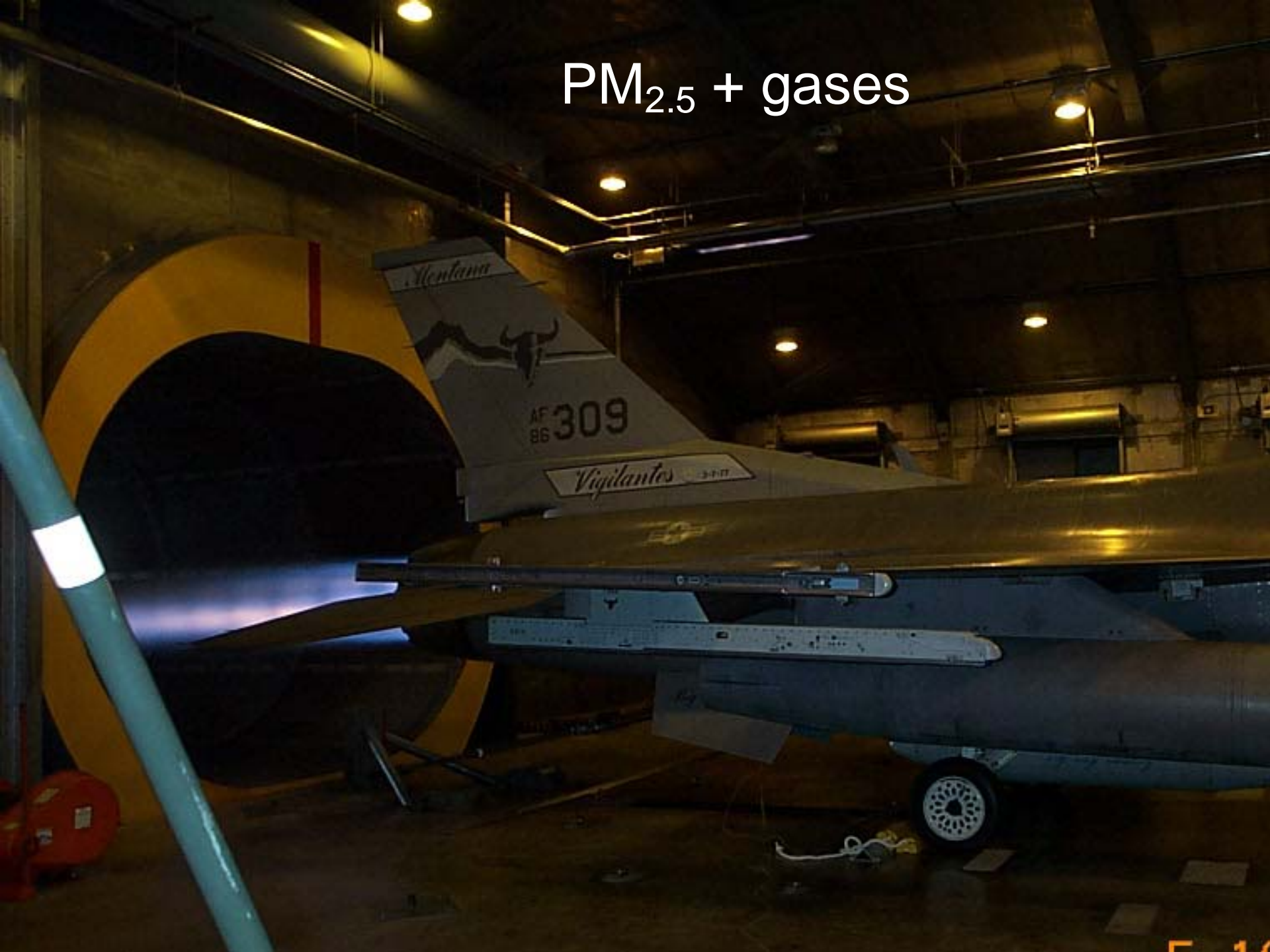
PM_{2.5} (smoke) and PM₁₀ (dust)



A photograph of a dark industrial interior, likely a factory or warehouse. The scene is dimly lit by several yellow overhead lights. On the left side, there is a large, complex blue machine with many vertical components. The floor is dark and reflective. In the background, more industrial structures and equipment are visible, though they are less distinct due to the low light. The overall atmosphere is industrial and somewhat mysterious.

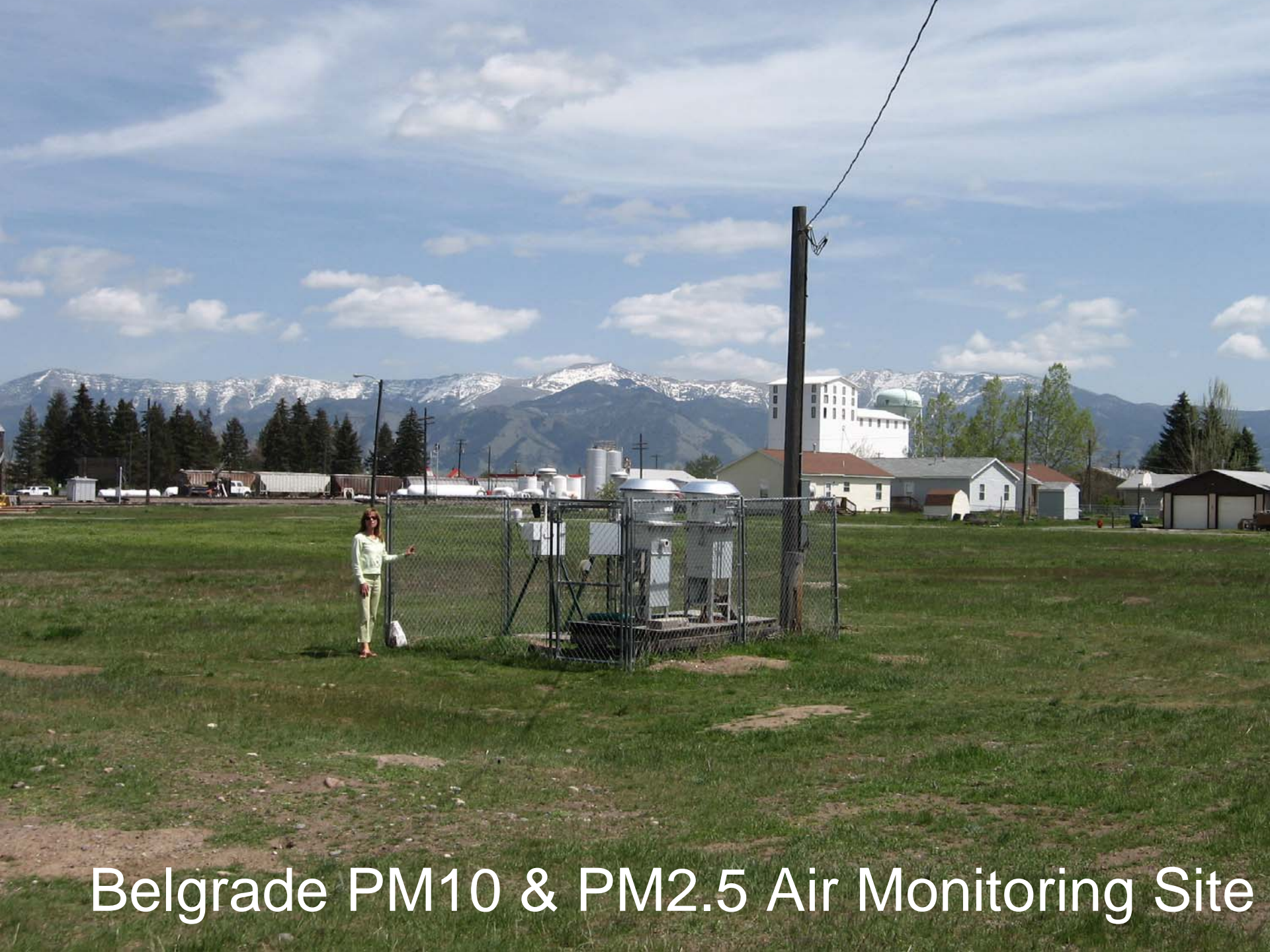
Mostly PM_{2.5} + some PM₁₀

PM_{2.5} + gases



Particulate Matter <10 microns (PM₁₀)

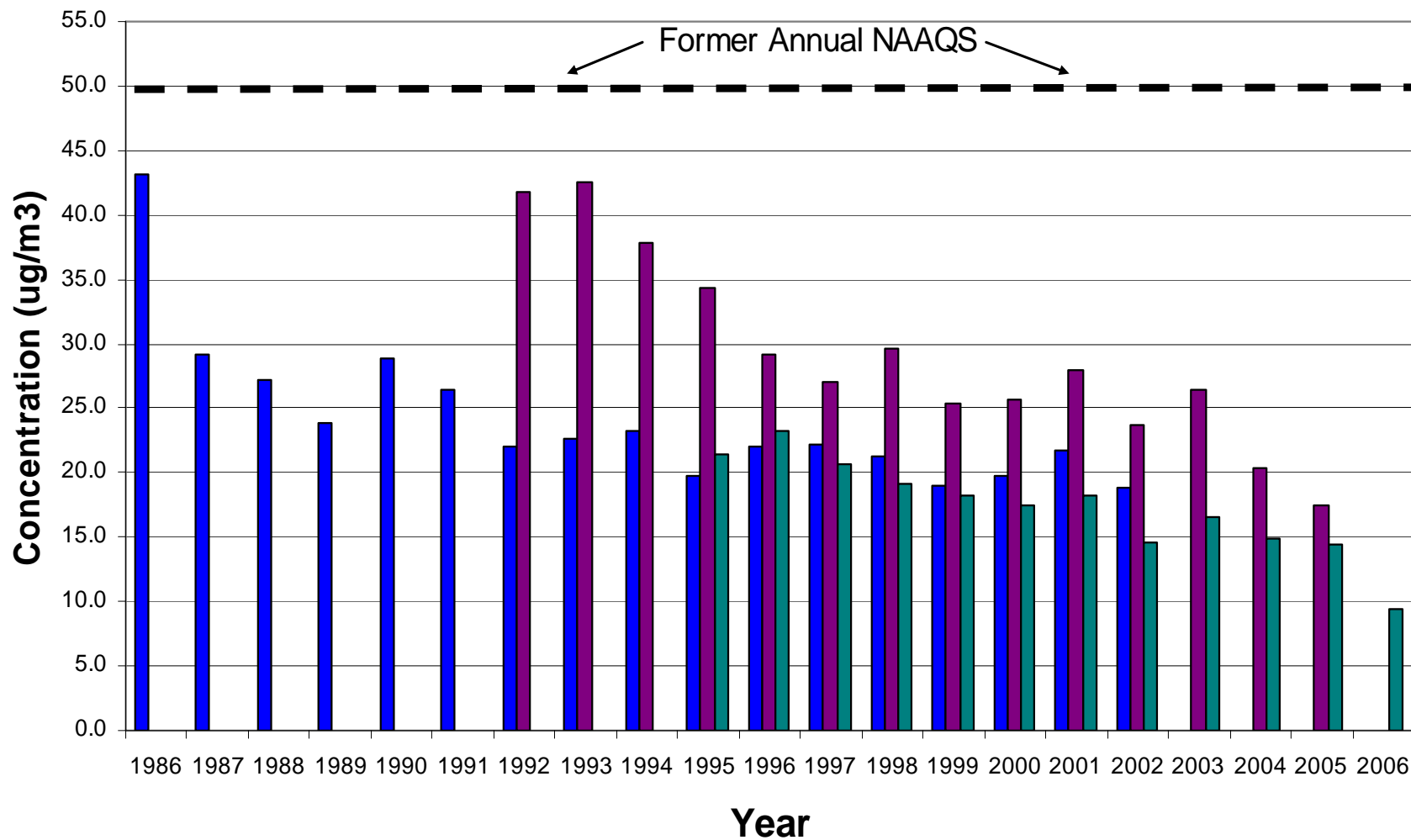
- PM₁₀ NAAQS initially set in 1987
- 24-hour standard = 150 µg/m³
- Annual standard = 50 µg/m³
- Revised NAAQS effective 18 Dec.2006
- 24-hour standard retained
- Annual standard revoked




Belgrade PM10 & PM2.5 Air Monitoring Site

Gallatin PM10 Annual Means

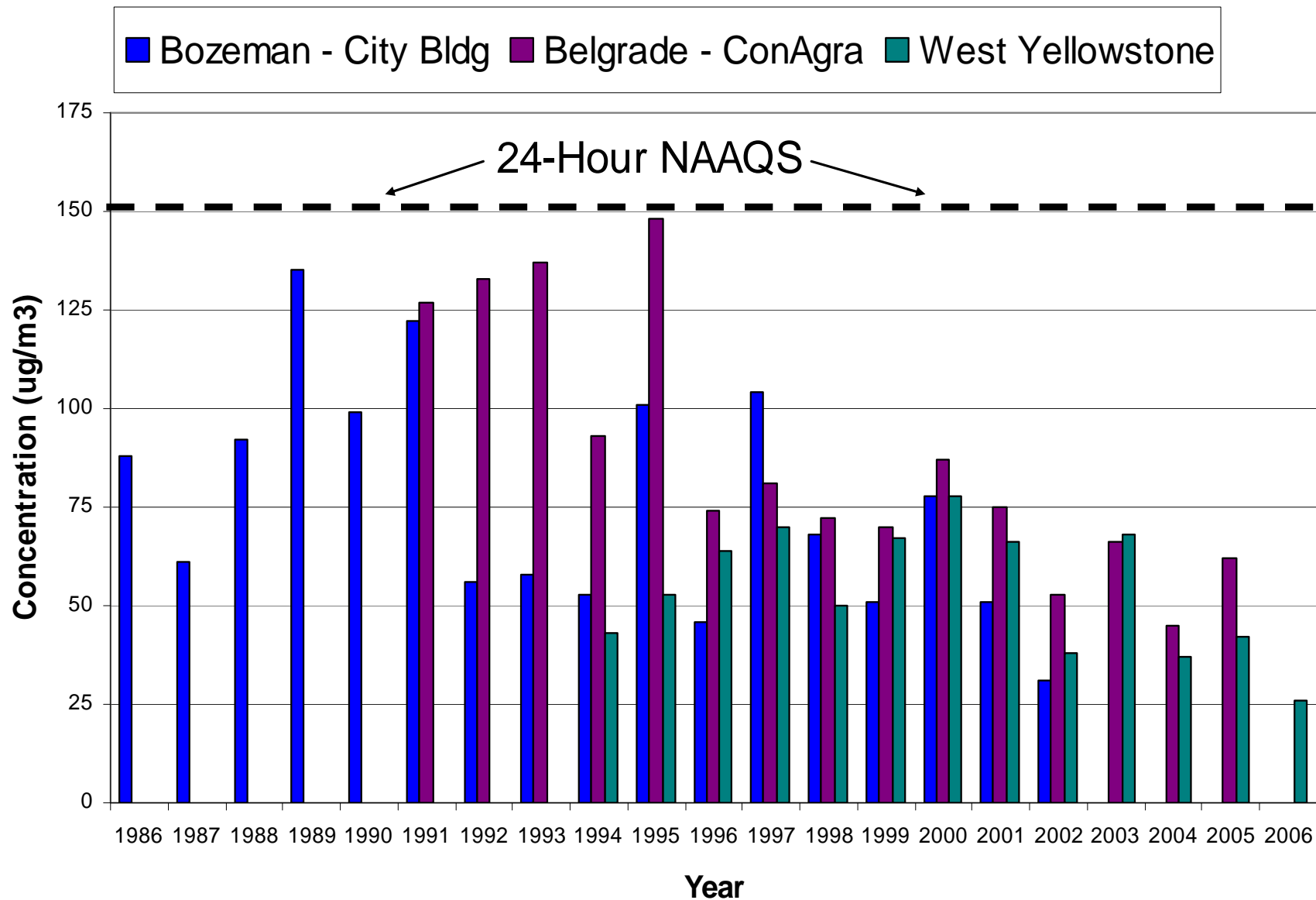
Bozeman - City Bldg Belgrade - ConAgra West Yellowstone





Road Dust = Mostly
PM10 and larger sizes

Gallatin PM10 Max 24HR Values



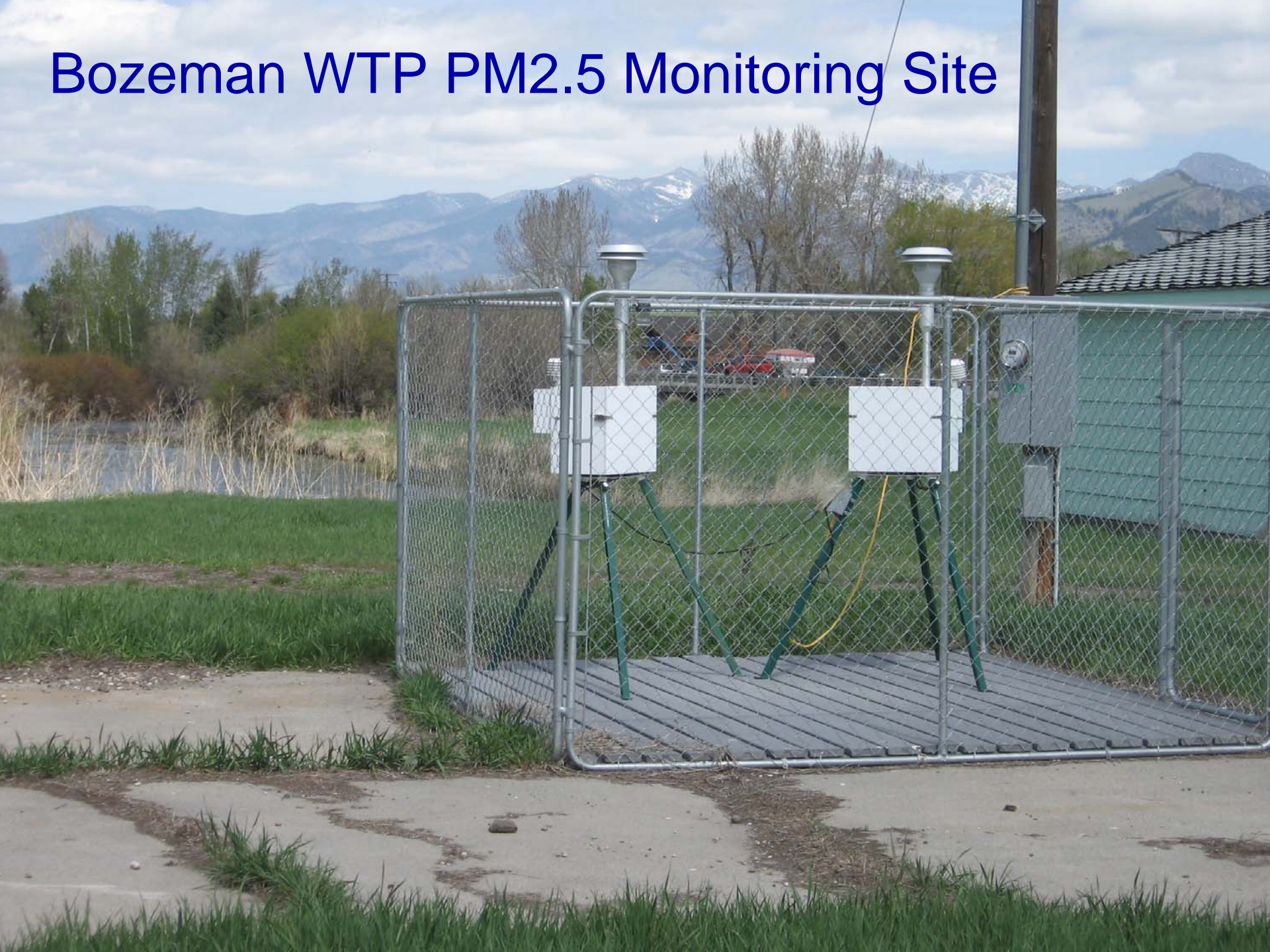
Mostly PM₁₀ & larger particles



Particulate Matter <2.5 Microns (PM_{2.5})

- PM_{2.5} NAAQ established in 1997
- 24-hour PM_{2.5} standard = 65 µg/m³
- Annual PM_{2.5} standard = 15 µg/m³
- Revised NAAQS effective 18 Dec. 2006
- 24-hour PM_{2.5} standard = 35 µg/m³
- Annual PM_{2.5} standard = 15 µg/m³

Bozeman WTP PM2.5 Monitoring Site



PM_{2.5} Air Pollution Sources

Wood-Burning Stoves



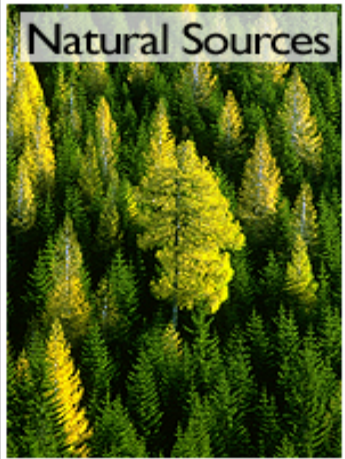
Power Plants



Heavy Duty Diesel Engines

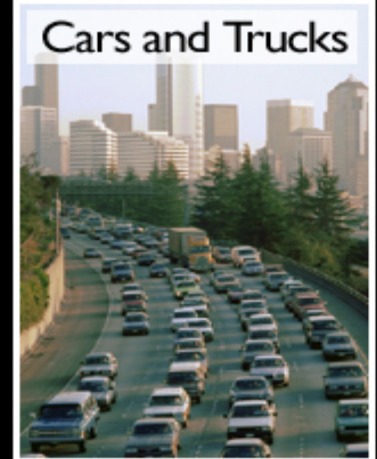


Natural Sources



**Fine Particles Can Be
Emitted Directly or Formed
in the Air from Gases**

Cars and Trucks



Non-Road Vehicles



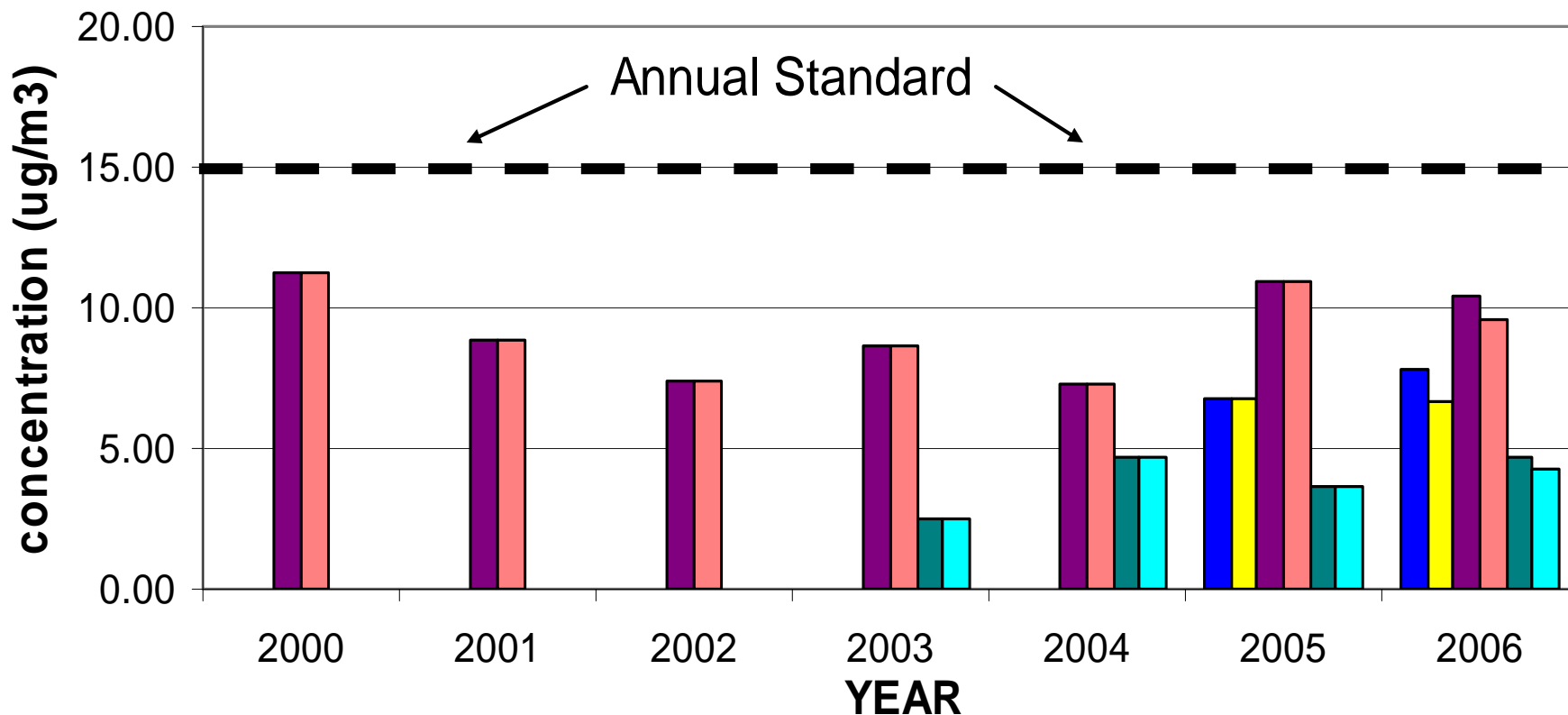
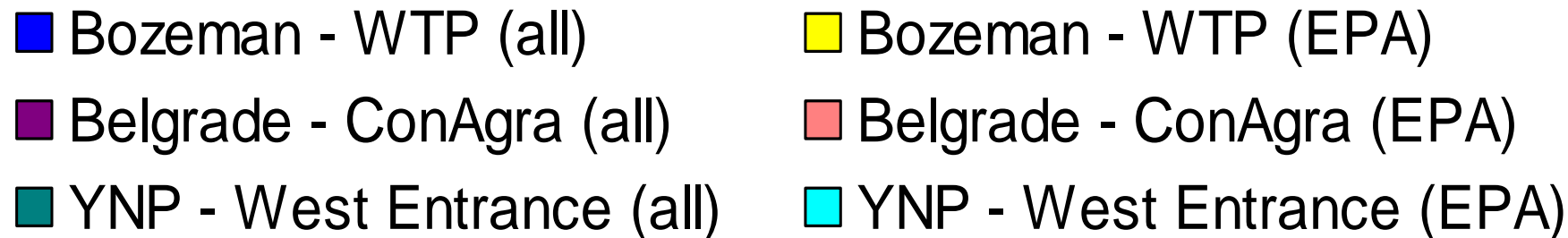
Forest Fires



Industrial Sources



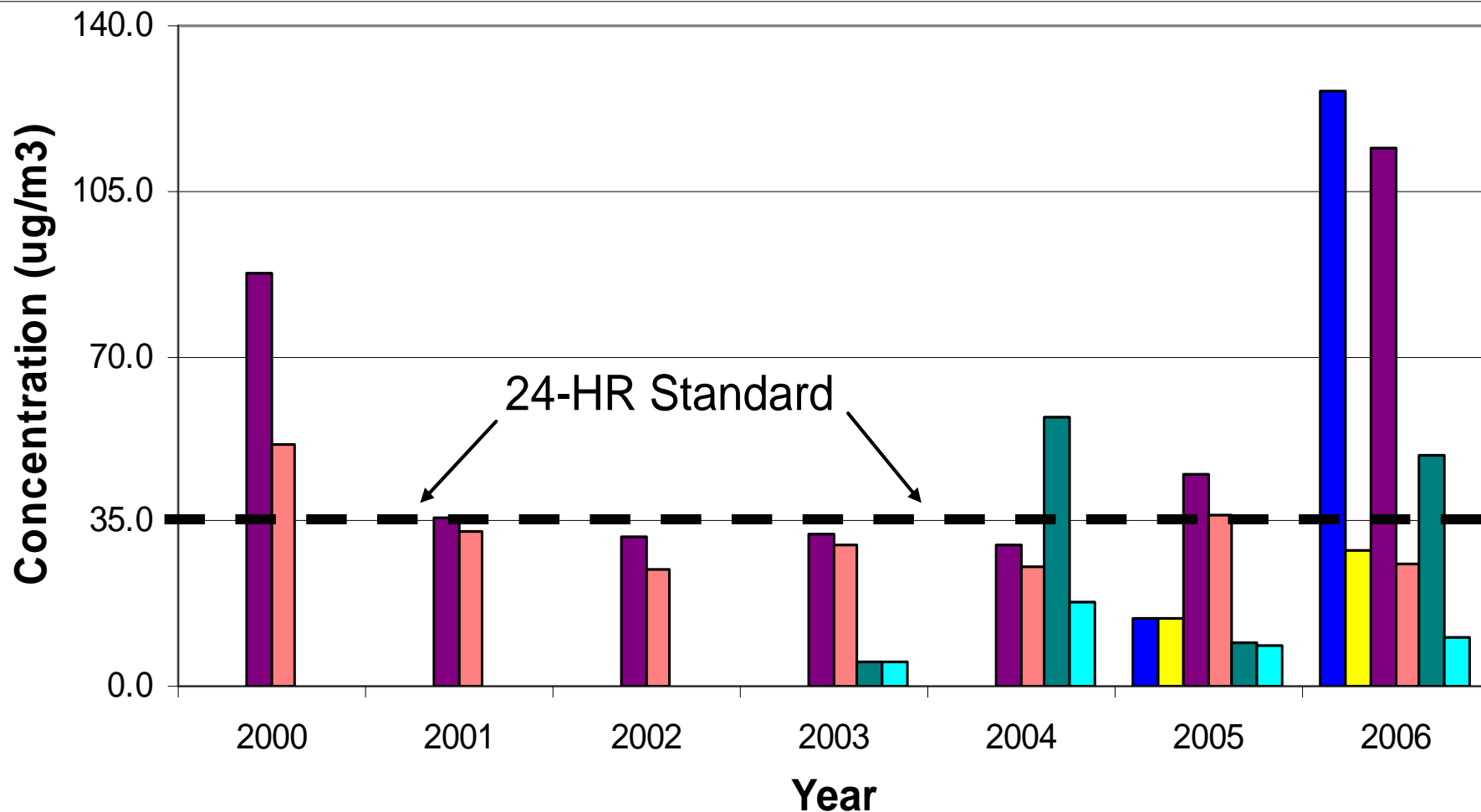
Gallatin PM2.5 Annual Means



Exceptional Events



Gallatin PM2.5 Max & 98th Percentile Values





$MV = PM_{2.5} + \text{gases}$

OB = PM_{2.5} + carcinogens



Diesel = $\text{PM}_{2.5}$ + carcinogens





RWC = PM_{2.5} + carcinogens

A topographic map of Western Montana, showing mountain ranges and valleys. The map uses color shading to represent elevation, with darker colors indicating higher altitudes. The text "Western Montana = Mountain Valleys" is overlaid in blue.

Western Montana = Mountain Valleys

Mountain Valleys = Temperature Inversions



10.14

PM_{2.5} NAAQS Compliance Review

- Belgrade 24-Hr Avg. 2004-6 = 29.1 $\mu\text{g}/\text{m}^3$
- Bozeman 24-Hr Avg. 2004-6 = ??? $\mu\text{g}/\text{m}^3$
- W. Yellowstone 24-Hr Avg. = 12.2 $\mu\text{g}/\text{m}^3$
- 12/18/07: Montana submits NAA list to EPA
- 12/18/08: EPA makes final NAA decisions
- EPA will evaluate 2007 data


http://www.epa.gov/air/data/index.html

EPA AirData - Access to Air Pollution Data - Microsoft Internet Explorer

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Purpose

The **AirData** Web site gives you access to air pollution data for the entire United States. Want to know the highest ozone level measured in your state last year? Ever wonder where air pollution monitoring sites are located? Are there sources of air pollution in your town? *You can find out here!* AirData produces reports and maps of air pollution data based on criteria that you specify.

Data

AirData presents annual summaries of air pollution data from two EPA databases:

- [AQS](#) (Air Quality System) database provides air monitoring data - ambient concentrations of criteria and hazardous air pollutants at monitoring sites, primarily in cities and towns.
- [NEI](#) (National Emission Inventory) database provides estimates of annual emissions of criteria and hazardous air pollutants from all types of sources. The NEI database in 2002 replaced two separate EPA databases for emissions of criteria air pollutants (National Emission Trends, or NET) and hazardous air pollutants (National Toxics Inventory, or NTI).

Start |       EPA AirData - ... |  Inbox - Microsoft ... |  Microsoft PowerP... |  G:\ARMB\Photos... |  HollandLake_081... | << >> <> <> <> <> 9:13 AM

http://www.deq.mt.gov/AirQuality/AQinfo.asp

Montana DEQ - Air Quality Information Home Page - Microsoft Internet Explorer

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[State Implementation Plan \(SIP\)](#)
[Maps](#)
[...more](#)

WHAT'S NEW?

- [Missoula Wood Stove Program Review](#)
- [EPA Wood Stove Change Outs](#)
- [Montana Air Quality Mapping Tool](#)
- [Ravalli Air Quality Review](#)
- [Ravalli Air Program Development](#)
- [New Example Burn Plan](#)
- [Burn Categorization Guidance](#)
- [Air Quality Conditions Web Cam](#)
- [Summary of Permitting Obligations for Oil & Gas Facilities](#) (updated 12/14/05)



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Montana's Clean Air – A Resource Worth Protecting!



Questions?

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Email: rjeffrey@mt.gov

<http://www.deq.mt.gov/AirQuality/AQinfo.asp>